

Effect of Citric Acid on CoMoS/Al₂O₃ Catalyst for Hydrodesulfurization of FCC Decant Oil

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Decant oil (DO), the bottom product of the fluidized catalytic cracking (FCC) process in a refinery, is used as a desirable feedstock for a high quality coke production due to enriched anisotropic microstructure. However, the high content of refractory sulfur compounds in the feedstock (FCC-DO) should be removed to obtain high-value coke. As a conventional hydrotreating catalyst, CoMoS/Al₂O₃ has long been used for treating light to middle boiling point feedstocks, while heavier feed like FCC-DO requires further improvement of activity and stability of the catalyst. In this study, the different size and stacking number of CoMoS phase was obtained with using citric acid in the preparation of CoMoS/Al₂O₃ catalyst, and the active phase for the HDS of FCC-DO was verified by EXAFS and TEM analysis. The HDS activity was tested in a batch reactor at 653 K and 9.2 MPa H₂ with 30 g of FCC-DO, 0.3 g of un-calcined catalyst and 1.5 g of dimethyl disulfide (DMDS). It was confirmed that citric acid added CoMo/Al₂O₃ catalyst presented a higher HDS activity than the conventional one at the same condition.